ORDER NO. MEW/CLD 7806-15

Service Manual

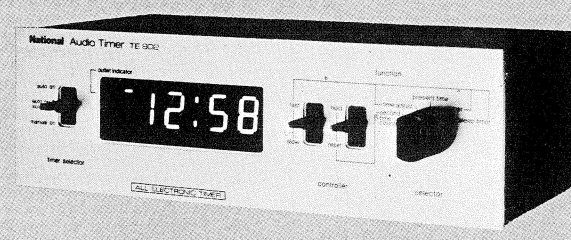
Audio Timer

TE902,903

(Fluorescent)

Specification

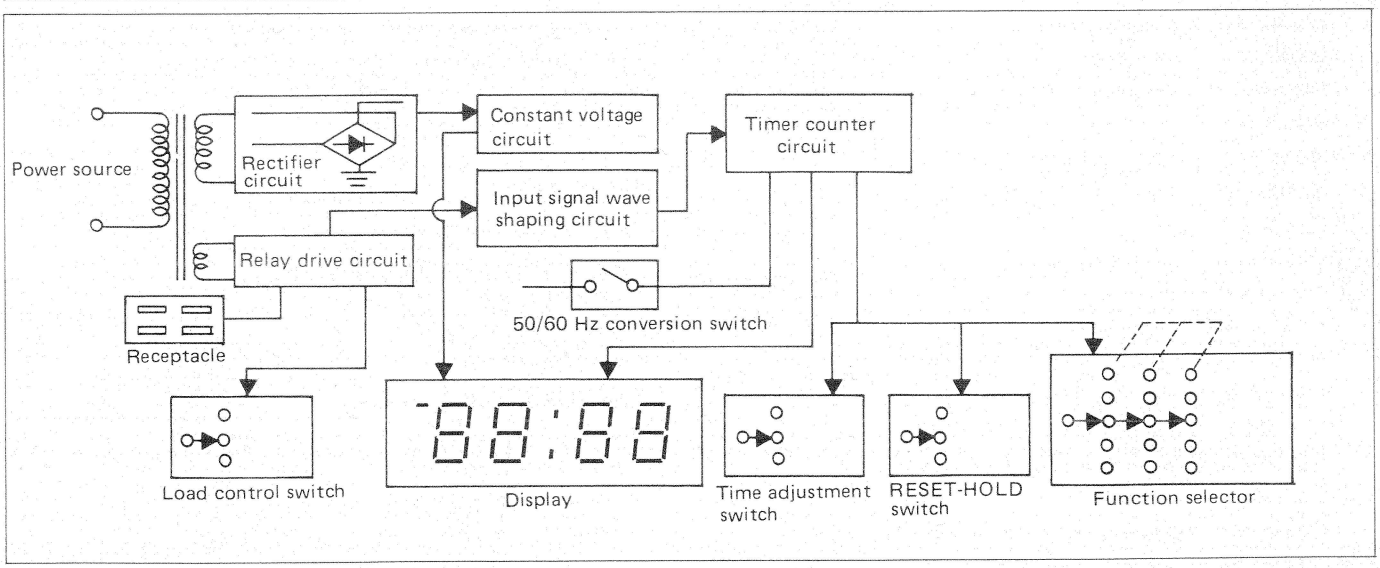
Power source:	120V AC, 220V AC, 240V AC 50/60 Hz
Power consumption:	8 W
Power capacity:	400 W
Clock accuracy:	Synchronizes with AC power frequency
Timer accuracy:	+0.02 second against preset time
Functions:	Automatic ON Automatic ON and 59 minutes later OFF Sleep timer (1 – 59 minutes) Time counter
Dimensions:	88 x 250 x 137 mm
Weight:	2,080 g



TE902 (Fluorescent)

TE903 (Fluorescent)

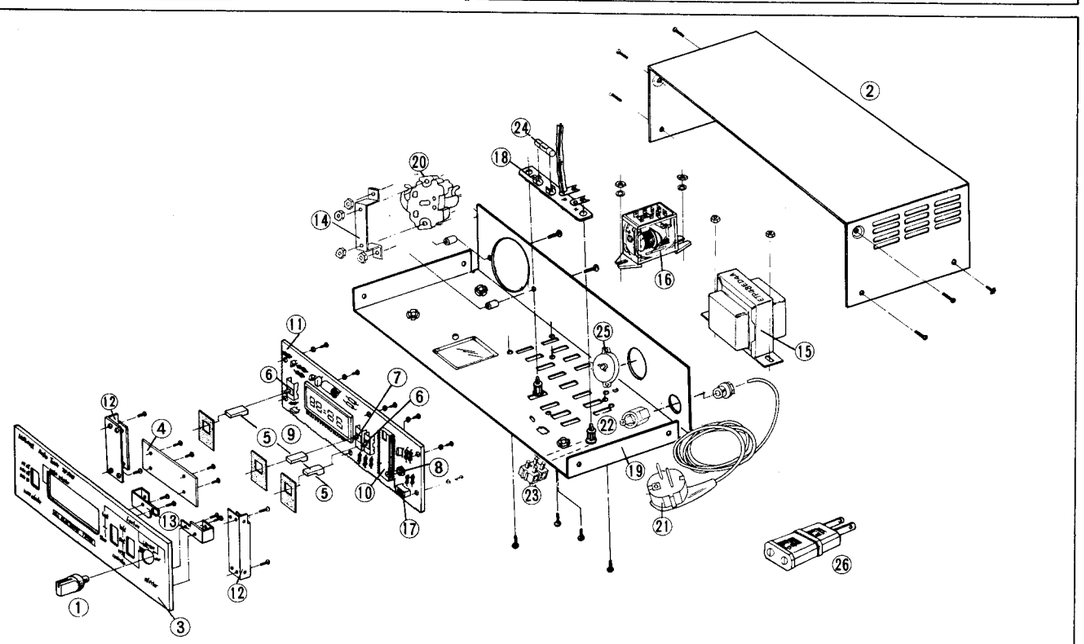
BLOCK DIAGRAM



National

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

DISMANTLED VIEW



REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Per set		
1	TE90303597	Switch knob	1		
2	TE90303087A	Upper case (w/o diagram)	1		
3	TE90303068	Front panel	1		
	TE90203068	Front panel (TE902 only)	1		
4	TE90303108	Display cover	1		
5	TE90303607	Switch lever	3		
6	TE90302597	Lever switch A	2		
7	TE90302607	Lever switch B	1		
8	TE90302617	Rotary switch	1		
9	TE93002367	Display (fluorescent)	1		
10	TE93002377	LSI	1		
11	TE90302107	Printed circuit base	1		
12	TE90300797	Bracket A	2		
13	TE90300807	Bracket B	2		
14	TE90300807A	Bracket C (for C2 receptacle)	1		
	TE90300807B	Bracket D (Denmark only)	1		
15	TE90302231	Transformer A (100 – 110V)	1		
	TE90302231D	Transformer B (120/220/240V)	1		
16	TE90305308	Relay	1		
17	TE90302647	Frequency conversion switch (PX only)	1		
18	TE90302638	Fuse holder base	1		
19	TE90303098	Lower case A (w/receptacle A2 hole)	1		
	TE90303098B	Lower case B (England only)	1		
	TE90303098C	Lower case C (PX only)	1		

Ref. No.	Part No.	Part Name & Description	Per set		
19	TE90303098E	Lower case D (Netherlands only)	1		
	TE90303098J	Lower case E (Denmark only)	1		
20	TE90302507	Receptacle A (A2)	1		
	TE90302507B	Receptacle B (England only)	2		
	TE90302507E	Receptacle C (Denmark only)	1		
	TE90302507F	Receptacle D (Netherlands only)	1		
	TE90302507G	Receptacle E (PX only)	1		
21	TE90302057	Cord A (A2)	1		
	TE90302057A	Cord B (B2)	1		
	TE90302057B	Cord C (England only)	1		
	TE90302057E	Cord D (Denmark only)	1		
	TE90302057F	Cord E (Netherland only)	1		
	TE90302057G	Cord F (PX only)	1		
22	TE90300357A	Bushing	1		
23	TE90303588A	Terminal	1		
24	TE90300317A	Fuse (160mA)	1		
25	TE90302017A	Voltage conversion switch (PX only)	1		
26	TE90302217A	Adapter sets (PX only)	1		
27	TE90308107A	Operating instruction A (English)	1		
	TE90308107B	Operating instruction B (German)	1		
	TE90308107C	Operating instruction C (French)	1		
	TE90308107G	Operating instruction D (PX)	1		
28	TE90308007A	Individual box	1		

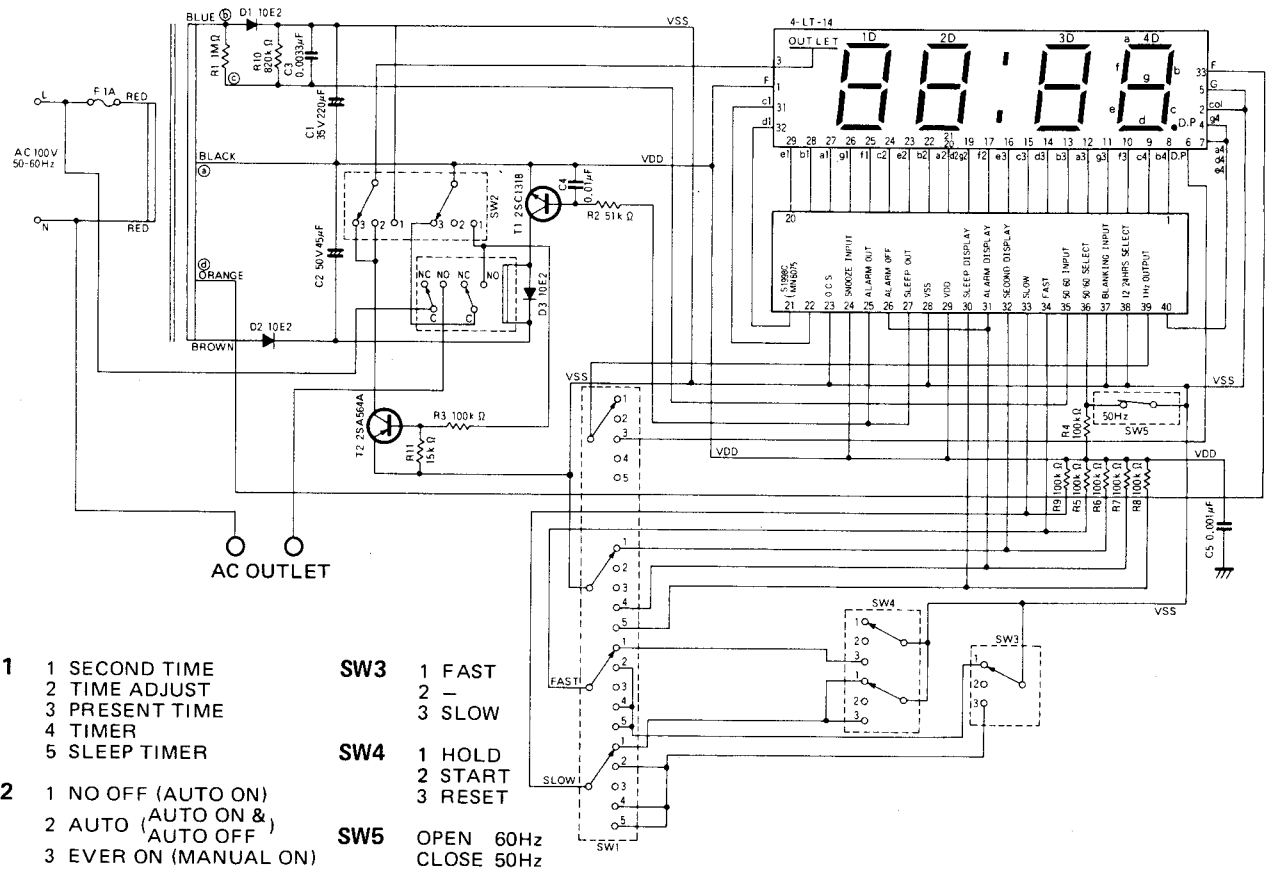
Note Printed circuit board includes No. 9 and No. 10

TROUBLESHOOTING CHECKLIST

Inspection and maintenance procedure

Symptom		Cause	Method of correction	Check point
Timer display related	No light at all	Blown fuse	Replace fuse	Check for short in wiring
		Open power cord	Replace power cord	Check for open in power cord
		Display tube is cracked or broken	Replace display tube or printed circuit base	Check for damage to display tube
		Open transformer	Replace transformer	Check both primary and secondary of transformer
		Defective transformer lead soldering	Repair soldering	Check soldering
	There are segments with no light	Open pattern	Correct pattern	Check for open circuit
		Bad soldering on LSI display tube lead	Correct soldering	Check soldering
		Defective LSI	Replace LSI or printed circuit base	Check LSI output
		Defective display tube	Replace display tube or printed circuit base	Check constant voltage
	Unnecessary segment lighted, light leakage	Display tube terminals touch	Replace display tube or printed circuit base	Check for short of display tube terminals
		Defective LSI	Replace LSI or printed circuit base	Circuit inspection Check LSI output
	Segment is weakly lit	Defective display tube	Replace display tube or printed circuit base	Check constant voltage
		Defective LSI	Replace LSI or printed circuit base	Check constant voltage, EBB voltage or Zener diode voltage.
	Segment is speckled	Defective display tube	Replace display tube or printed circuit base	Check constant voltage.
		Defective LSI	Replace LSI or printed circuit base	Check LSI output
	Entire segment is lit	Defective LSI	Change LSI or printed circuit base	This is the case of continuous output at each segment.
Clock related	Clock advances	Frequency fluctuation	Obtain automatic frequency corrector from power company	Check for increased error
		Wrong frequency	Correct selector switch position	Check position of selector switch
	Clock runs slow	Frequency fluctuation	Replace Zener diode or printed circuit base B	Check for increased error
		Wrong frequency	Correct selector switch position	Check selector switch position
	The flashing second indicator does not light	Defective LSI	Change LSI or printed circuit base	Check 39 pin LSI output
	The flashing second indicator remains lit	Defective LSI	Change LSI or printed circuit base	Check 39 pin LSI output
		Defective lead soldering	Repair soldering	Check soldering
	Second signal is not transmitted	R1, R10 resistance values are not rated value	Replace printed circuit base	Check resistance value
		C3 capacity is not rated value	Replace printed circuit base	Check condenser capacity
	Clock does not operate at all, quick advance has no effect	Defective LSI	Change LSI and printed circuit base A	Check wave form of input circuit
Timer related	When set time ON does not function	Open relay coil	Change relay	Check coil continuity
		Defective LSI	Change LSI or printed circuit base	Check 35 pin or 27 pin output
		Pattern around relay open	Correct relay pattern	Visual check
	Current flow indicator lights even though set time is not reached	(Relay does not operate) T2 transistor defective	Replace printed circuit base	Using a continuity checker, check continuity between emitter and collector. If the needle vibrates the transistor is defective.
		(Relay operates continuously) T1 transistor defective	Replace printed circuit base	
		Defective LSI	Change LSI or printed circuit base	Check 25 pin or 27 pin LSI output
Clock manipulation related	Without quick advance at normal condition, clock advances continuously	Defective LSI	Change LSI or printed circuit base	Check input voltage of 34 pin LIS
		Defective SW3	Change SW3	Check SW
	Slow advance is not effective	Defective LSI	Change LSI or printed circuit base	Check input voltage of 33 pin LSI
		Defective SW3	Change SW3	Check SW3

CIRCUIT DIAGRAM



SW1
1 SECOND TIME
2 TIME ADJUST
3 PRESENT TIME
4 TIMER
5 SLEEP TIMER

SW2
1 NO OFF (AUTO ON)
2 AUTO (AUTO ON & AUTO OFF)
3 EVER ON (MANUAL ON)

SW3
1 FAST
2 —
3 SLOW

SW4
1 HOLD
2 START
3 RESET

SW5
OPEN 60Hz
CLOSE 50Hz

INSPECTION METHOD

Circuit check measurement wave form

Condition	Test location	Test item	Oscilloscope – Digital meter: Probe	Oscilloscope – Digital meter: Ground	Normal voltage and wave form		Interpretation of measurement and malfunction location
No segment lighting at all	Ⓐ	Ⓐ Transformer secondary voltage	(Digital meter) ⓓ	(Digital meter) ⓐ	2.9V AC		No output voltage at VSS • Defective transformer • Defective lead soldering • Open circuit in copper foil pattern
		Filament voltage VSS	ⓑ	ⓐ	Relay OFF condition 20V DC		
Some segments do not light Segment lighting is weak Segment lighting flickers Timer does not switch power ON at set time	Ⓑ	Ⓑ LSI output wave form	①~㉒	ⓐ	Segment (No light condition)	Segment (Lighted condition)	In lighted condition, no output voltage • Defective LSI In lighted condition, LSI has output • Defective display unit • Open relay coil • Open relay circuit pattern • Defective LSI
Improper segment lights Light leakage exists	Ⓑ		㉕㉗	ⓐ	Compare with timer OFF condition wave form	Compare with timer ON condition wave form	No light condition with voltage output • Defective LSI No light condition with no voltage output • Defective display unit
Second indicator does not flash Second indicator flashes continuously	Ⓒ	Ⓒ LSI output wave form	㊴	ⓐ	Second indicator not flashing	Lighted	LSI 39 pin output: does it match wave form at left at 1 Hz? With no output, LSI is defective
Second signal is not transmitted Clock does not operate Fast advance does not help	Ⓓ	Ⓓ LSI output wave form	㉟	ⓐ			The voltage difference between VSS and Vp-p wave forms should not be excessive. When there is no wave form: • Open circuit in copper foil pattern • Defective transformer lead soldering • R1 (resistor) is defective or soldering is defective

Printed in Japan